

AMENDMENTS TO THE CLAIMS

Claim 1. (Currently Amended) Method for selective separation by density of each constituent of a mix of organic synthetic materials to be reused by recycling, stable within a precision level of ± 0.0005 about a density level d_s chosen as the density separation threshold equal to at least 1, and comprising separating them by density difference, in an aqueous suspension of an appropriate quantity of powder particles dispersed in a sufficient quantity to create the density level d_s chosen as the separation threshold of at least one of the constituents of the mix of synthetic organic materials to be selectively separated, wherein the separative suspension is formed from:

- a) solid powder particles with a size grading cutoff not more than 30 μm , these solid powder particles thus sized being dispersed in the aqueous phase in a sufficient quantity to reach the chosen density threshold d_s ,
- b) a water soluble stabiliser to stabilise the rheological and invariance characteristics of the density d_s with a precision of said ~~the said~~ density d_s of the suspension of solid powder particles equal to ± 0.0005 .

Claim 2. (Previously Presented) Method according to claim 1, wherein the solid powder particles have a size grading cut-off not more than 20 μm , these solid powder particles thus sized being dispersed in the aqueous phase in a sufficient quantity to create the chosen density threshold d_s .

Claim 3. (Previously Presented) Method according to claim 1, wherein the powder particles are of natural origin and are at least one of clays, belonging to families consisting of the group composed of kaolinites, comprising kaolinite, dickite, halloysite, disordered kaolinites, serpentines, the micas group and particularly muscovite, biotite, paragonite, pyrophyllite and talc, illites and glauconite, the montmorillonites group, stevensite, saponite, hectorite; the chlorites group; the vermiculites group; the interstratified clays group for which the unit structure is a combination of the previous groups; the fibrous clays group, sepiolite; the group consisting of calcium carbonate, magnesium carbonate, dolomite, dehydrated calcium sulphate, barium sulphate, talc, alumina, silica, titanium dioxide, zirconia, taken alone or mixed.

Claim 4. (Currently Amended) Method according to claim 1, wherein the powder particles are of synthetic origin and are ~~chosen~~ selected from among the group consisting of glass powders, precipitated calcium carbonate, and metallic powders, taken alone or mixed.

Claim 5. (Previously Presented) Method according to claim 1, wherein the median diametric dimension of the powder particles is limited to 5 μm .

Claim 6. (Currently Amended) Method according to claim 1, wherein the water soluble agent for stabilisation of rheological characteristics and to maintain the apparent density d_s of the suspension of solid powder particles, is ~~chosen~~ selected from the ~~group composed of~~ phosphates and polyphosphates, alkylphosphate esters, alkylphosphonate, alkylsulfate, alkylsulfonate esters, lignin, lignosulfonates in the form of calcium, sodium, iron, chromium, iron and chromium salts, copolymers of maleic anhydride and sulfonic styrene acid, substituted, neutralised, esterified or non-esterified copolymers of methylacrylamide and (methyl) acrylic acid, copolymers of sulfonic methylacrylamido-alkyl acid and (methyl) acrylamide acid, water soluble polymers of acrylic acid used in acid form of possibly wholly or partly neutralised by alkaline and/or alkali earth agents, by amines salified by single-valent and/or polyvalent ions, and/or esterified, or by water soluble acrylic copolymers with phosphated, phosphonated, sulphated or sulfonated functions.

Claim 7. (Cancelled)

Claim 8. (Currently Amended) Method according to ~~claim 7~~ claim 32, wherein, in ~~pattern~~ Z, the non-free acid functions are occupied by a cation, an ammonium group, an amine, ~~an alkyl in C_1 to C_3 , an aryl in C_3 to C_6 , substituted or not, an alkylaryl, an ester in C_1 to C_{12} , a C_1 to C_3 alkyl, an optionally substituted C_3 to C_6 aryl, an alkylaryl, a C_1 to C_{12} ester, or a substituted amide.~~

Claim 9. (Previously Presented) Method according to claim 8, wherein the total value of $n+p+q$, $n=0$, when $q>0$ and $q=0$ when $n>0$.

Claim 10. (Currently Amended) Method according to claim 8, wherein, in ~~patterns~~ R_1 and R_2 , the alcohol esterifying the carboxylic function is ~~C_1 to C_4~~ a C_1 to C_4 alcohol.

Claim 11. (Currently Amended) Method according to claim 9, ~~wherein, in pattern R₃, the alkyl radical in~~ wherein R₃ is a C₁ to C₄ alkyl radical.

Claim 12. (Currently Amended) Method according to claim 8, ~~wherein, in patterns R₄ and R₅, the alkyl radical is in~~ wherein R₄ and R₅ are a C₁ to C₄ alkyl radical.

Claim 13. (Currently Amended) Method according to claim 8, wherein, in patterns R₄ and R₅, the alcohol esterifying the carboxylic function is ~~C₁ to C₄~~ a C₁ to C₄ alcohol.

Claim 14. (Currently Amended) Method according to claim 8, ~~wherein, in pattern R₇, the alkyl radical is C₁ to C₄~~ wherein R₇ is a C₁ to C₄ alkyl radical.

Claim 15. (Currently Amended) Method according to claim 8, ~~wherein, in patterns R₅ and R₁₀, the ester is C₁ to C₃~~ wherein R₅ and R₁₀ are a C₁ to C₃ ester.

Claim 16. (Currently Amended) Method according to ~~claim 7~~ claim 32, wherein, in patterns R₉ and R₁₀, the alkyl is ~~C₁ to C₃~~ wherein R₉ and R₁₀ are a C₁ to C₃ alkyl.

Claim 17. (Currently Amended) Method according to ~~claim 7~~ claim 32, wherein, in pattern R₁₂, ~~the ester is C₁ to C₅~~ wherein R₁₂ is a C₁ to C₅ ester.

Claim 18. (Currently Amended) Method according to ~~claim 7~~ claim 32, wherein, in pattern R₁₂, ~~the alkyl is C₁ to C₃~~ wherein R₁₂ is a C₁ to C₃ alkyl.

Claim 19. (Currently Amended) Method according to ~~claim 7~~ claim 32, wherein the molecular mass M_w of water soluble acrylic copolymers forming the stabilisation agent is between 5000 ~~5,000~~ and ~~100,000~~ 100,000.

Claim 20. (Currently Amended) Method according to ~~claim 7~~ claim 32, wherein the water soluble acrylic copolymers forming the stabilisation agent are at least partially neutralised, using a neutralisation agent ~~chosen~~ selected from the group ~~composed~~ consisting of sodium hydroxide, potassium hydroxide, ammonium hydroxide, calcium hydroxide, magnesium hydroxide hydroxides, and a primary amine, a secondary amine, or a tertiary amine, an aliphatic amine, and a and/or cyclic amine amines.

Claim 21. (Previously Presented) Method according to claim 1, wherein the quantity by weight of the water soluble stabilisation agent is expressed as the dry weight of said agent as a percentage of the dry weight of powder particles put in suspension, and is between 0.02% and 5% dry weight based on the dry weight of the powder particles.

Claim 22. (Previously Presented) Method according to claim 1, wherein the aqueous phase has a conductivity of not more than 50 ms.

Claim 23. (Previously Presented) Method according to claim 1, wherein said method is carried out in at least one hydraulic separator.

Claim 24. (Previously Presented) Method according to claim 23, wherein, when said method is carried out in a single hydraulic separator, the chosen density d_s varies:

- in increasing order, by controlled addition of the defined powder particles and the water soluble stabilisation agent in the suspension present in the said hydraulic separator, until the new chosen threshold density d_s is obtained,
- in decreasing order, by adding water until obtaining the new chosen threshold density d_s .

Claim 25. (Previously Presented) Method according to claim 24, wherein the density of the separative stable suspension is varied, to increase it or to decrease it, while maintaining mechanical stirring of the dense aqueous medium being corrected and/or while recirculating the dense medium by drawing off from the bottom of the hydraulic separator and reinjection at the top of said separator.

Claim 26. (Previously Presented) Method according to claim 23, wherein if said method is performed in several hydraulic separators, the various separators are placed one after the other, using a cascade system operating with stable suspensions each having a precise density threshold d_s , in an increasing or decreasing order of the densities.

Claim 27. (Previously Presented) Method according to claim 23 wherein the threshold density ρ_s of the precise aqueous separative suspension is continuously controlled by appropriate measurement means and is corrected as soon as a drift is detected.

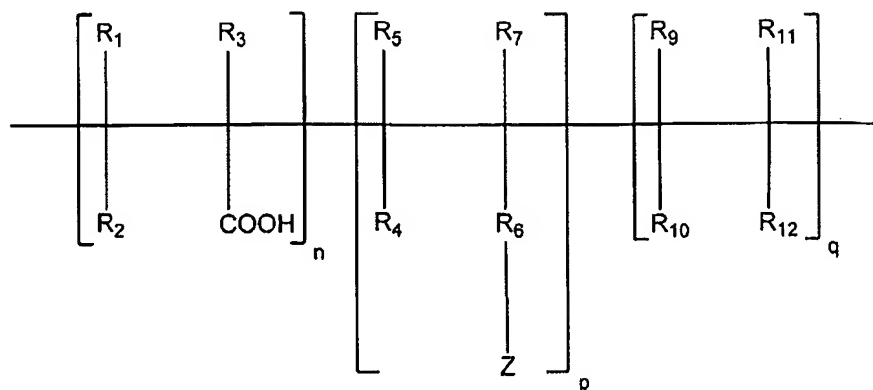
Claim 28. (Currently Amended) Method according to claim 27, wherein the density of the dense medium contained in each hydraulic separator is controlled using two solenoid valves each opening onto two circuits connected to two reservoirs, one of the reservoirs containing a concentrated mother suspension of powder particles, stabilised with a water soluble stabilisation agent so that a determined quantity of ~~the mother~~ a mother suspension can be added to make an upward correction to any downward drift in the density of the dense precise separation medium, the other tank containing water so that a determined quantity of water can be added to make a downward correction to any upward drift in the density of the dense precise separation medium.

Claim 29. (Previously Presented) Method according to claim 28, wherein the density of the dense medium in each hydraulic separator is measured continuously by appropriate measurement instruments that trigger opening of one of the solenoid valves and then close it when the threshold density ρ_s is reached.

Claim 30. (Previously Presented) Method according to claim 23, wherein each suspension may be recirculated in each hydraulic separator by drawing off said suspension at the bottom of said separator and reinjecting it into the upper part.

Claim 31. (Previously Presented) A method of claim 1, wherein said method is for selectively separating mixed polymer materials.

Claim 32. (New) Method according to claim 6, wherein the water soluble agent is chosen from among water soluble acrylic copolymers satisfying the general formula:



wherein:

Z is a phosphate, phosphonate, sulphate, sulfonate with at least one free acid function;

n is between 0 and 95;

p is between 95 and 5;

q is between 0 and 95;

wherein the total value of n+p+q is equal to 100;

R₁ and R₂ are hydrogen simultaneously, or one is hydrogen while the other is a carboxylic acid, optionally esterified by a C₁ to C₁₂ alcohol;

R₃ is hydrogen or a C₁ to C₁₂ alkyl radical;

R₄ and R₅ are simultaneously or separately hydrogen, a C₁ to C₁₂ alkyl radical, a substituted or non-substituted aryl, or a carboxylic acid, optionally esterified by a C₁ to C₁₂ alcohol;

R₆ is:

an alkylene with formula (CH₂)_r, wherein r is 1 to 12,

an oxide or polyoxide of alkylene with formula (R₈O)_s, wherein R₈ is a C₁ to C₄ alkylene and s is 1 to 30, or

a combination of (CH₂)_r and (R₈O)_s;

R₇ is hydrogen or a C₁ to C₁₂ alkyl radical;

R₉ and R₁₀ are simultaneously hydrogen, or one is hydrogen and the other is a carboxylic group, a C₁ to C₁₂ ester, a C₁ to C₁₂ alkyl, a C₅ or C₆ aryl, or an alkylaryl;

R₁₁ is hydrogen, a carboxylic group, a C₁ to C₃ alkyl, or a halogen;

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R_{12} is a C_1 to C_{12} ester, a substituted or non-substituted amide, a C_1 to C_{12} alkyl, C_5 or C_6 aryl, an alkylaryl, a halogen, a carboxylic group or an alkyl or aryl phosphated, phosphonated, sulphated, sulfonated group.